SLOVENSKI STANDARD
SIST ENV 12108:2002

01-junij-2002

Cevni sistemi iz polimernih materialov - Navodila za vgradnjo tlaļ nih cevovodov za hladno in toplo pitno vodo v stavbah

Plastics piping systems - Guidance for the installation inside buildings of pressure piping systems for hot and cold water intended for human consumption

Kunststoff-Rohrleitungssysteme - Empfehlungen zum Einbau von Druckrohrleitungssystemen für die Versorgung innerhalb von Gebäuden mit Warm- und Kaltwasser, das für den menschlichen Gebrauch bestimmt ist

Systemes de canalisations plastiques - Pratiques et techniques recommandées pour l'installation a l'intérieur de structures de bâtiments de systemes de canalisations sous pression pour l'eau chaude et l'eau froide destinées a la consommation humaine

Ta slovenski standard je istoveten z: **ENV 12108:2001**

ICS:

23.040.01	Deli cevovodov in cevovodi na splošno	Pipeline components and pipelines in general
91.140.60	Sistemi za oskrbo z vodo	Water supply systems

SIST ENV 12108:2002 **en**

EUROPEAN PRESTANDARD

PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM

ENV 12108

January 2001

ICS 23.040.01; 91.140.60

English version

Plastics piping systems - Guidance for the installation inside buildings of pressure piping systems for hot and cold water intended for human consumption

Systèmes de canalisations plastiques - Pratiques et techniques recommandées pour l'installation à l'intérieur de structures de bâtiments de systèmes de canalisations sous pression pour l'eau chaude et l'eau froide destinées à la consommation humaine

Kunststoff-Rohrleitungssysteme - Empfehlungen zum Einbau von Druckrohrleitungssystemen für die Versorgung innerhalb von Gebäuden mit Warm- und Kaltwasser, das für den menschlichen Gebrauch bestimmt ist

This European Prestandard (ENV) was approved by CEN on 25 November 1999 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. ENV 12108:2001 E

Contents

Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NEN.

This document includes the following:

Annex A (informative) Thermal length variation as a function of the pipe length and temperature difference for pipe materials.

Bibliography

At the date of publication of this prestandard, System Standards for piping systems of hot and cold water applications inside buildings, are the following:

NOTE The listed System Standards are under preparation.

EN 12731, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C)*

EN ISO 15874, *Plastics piping systems for hot and cold water installations — Polypropylene (PP)*

EN ISO 15875, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X)*

EN ISO 15876, *Plastics piping systems for hot and cold water installations — Polybutylene (PB)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European prestandard covers the material-related aspects of installation practice. General requirements including design consideration and pipe sizing are given in prEN 806 series.

It is essential when dealing with techniques for the installation inside buildings of pressure piping systems to choose the correct type of products for the installation and that a well established installation technique is used. The system supplier/manufacturer should supply detailed instructions for satisfactory handling, storage and installation.

1 Scope

This European Prestandard recommends practices to be followed in the application and installation of thermoplastics pipes and associated fittings. These fall within the scope of EN 806-1 and prEN 12731, prEN ISO 15874, prEN ISO 15875, prEN ISO 15876 and (hot and cold water) to be used for hot and/or cold water distribution intended for human consumption inside buildings. This document can also be used for heating installations if applicable, except for under floor heating for which EN 12164 can apply.

Guidance is also given on acceptable methods of jointing polybutylene (PB), crosslinked polyethylene (PE-X), polypropylene (PP) and chlorinated poly(vinyl chloride) (PVC-C) pipes and associated fittings, together with recommendations for their storage, handling and transportation.

2 Normative reference

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 806-1, *Specifications for installations inside buildings conveying water for human consumption — Part 1: General*

3 Definitions and symbols

For the purposes of this European prestandard the definitions given in EN 806-1 apply.

4 Storage, transport and handling

4.1 General

Pipe ends should be covered or protected in such a way that dirt is prevented from entering the pipe.

Pipe with end treatment, such as flanging, forming or pre-assembled fittings, should be stacked or supported so that the ends are free from loading and damage.

When storing, transporting and handling, original packing should be used if possible.

4.2 Storage

The storage chosen should not cause any change to pipe dimensions and the storage area should be such that it does not cause any damage to the pipe surface.

All fittings and accessories should be stored in their original containers, or as recommended by the system supplier/manufacturer.

Storage in direct sunlight should be avoided, as extended exposure to UV light can lead to deterioration.

4.3 Handling

Loading and unloading of pipes should be carried out with care to avoid damage.

Where mechanical handling is employed, the techniques used should ensure that no damage to pipes can occur. Metal slings, hooks and chains should not come into contact with the pipe.

Pipes should not be dragged along rough ground or dropped on a hard surface.

4.4 Transport

Vehicles with a flat bed should be used for transporting pipe. The bed should be free from nails or other projections. Straight lengths should be uniformly supported along their length.

Pipes should be loaded on vehicles in such a way that there is no unnecessary overhang.

5 Design considerations

5.1 Service conditions

The installed pipe work system should be capable of operation at the applicable service conditions in accordance with classes specified in prEN 12731, prEN ISO 15874, prEN ISO 15875, and prEN ISO 15876.

5.2 Materials and components

Components for hot and cold water pipes should alternatively conform to prEN 12731, prEN ISO 15874, prEN ISO 15875, prEN ISO 15876.

6 Installation

6.1 Pipe supports - General

Pipe supports should be designed to provide a permanent fixing. Where fittings such as valves and manual controls are used, these should be firmly anchored so as to minimize any moment imparted to the pipe by operation e.g. of hand wheels or levers.

Spacing distances should be in accordance with the system supplier's/manufacturer's installation instructions. Clamps/brackets to support pipe should be designed in such a way that the function of the piping system is not affected. Where pipes are adequately supported through joists or on boarding, intermediate clips may not be necessary.

6.2 Installation of pipes allowing thermal length variation

6.2.1 General

NOTE Annex A shows the thermal length variation ΔL as function of length of pipe and temperature difference for PVC-C, PE-X, PP-R and PB.

Pipes are subjected to thermal length variation, which requires consideration to prevent any damage, particularly for rigid pipes. There are different ways to consider this.

Thermal length variation of a thermoplastic pipe can be calculated according to equation (1):

$$\Delta L = \Delta T \times L \times \alpha \qquad (1)$$

where:

ΔL is the thermal length variation, in millimetres;

ΔT is the temperature difference, in Kelvin;

L is the length of pipe, in metres;

α is the coefficient of thermal expansion (thermal length variation), in millimetres per metre, per Kelvin.

Reference values for α are given in Table 1.

Table 1 — Reference values of thermal length variation

Material	α mm/m K	Figure
PVC-C	0,07	A.1
PE-X	0,15	A.2
PP-R	0,15	A.2
PB	0,13	A.3

6.2.2 Positioning of anchor points

The positioning of anchor points can be used to give direction and to limit to the amount of thermal length variation. The anchor points can be positioned in such a way that variations of lengths can be split in different directions. Examples are given in Figures 1 to 3.

This is also valid for header pipes in a basement.

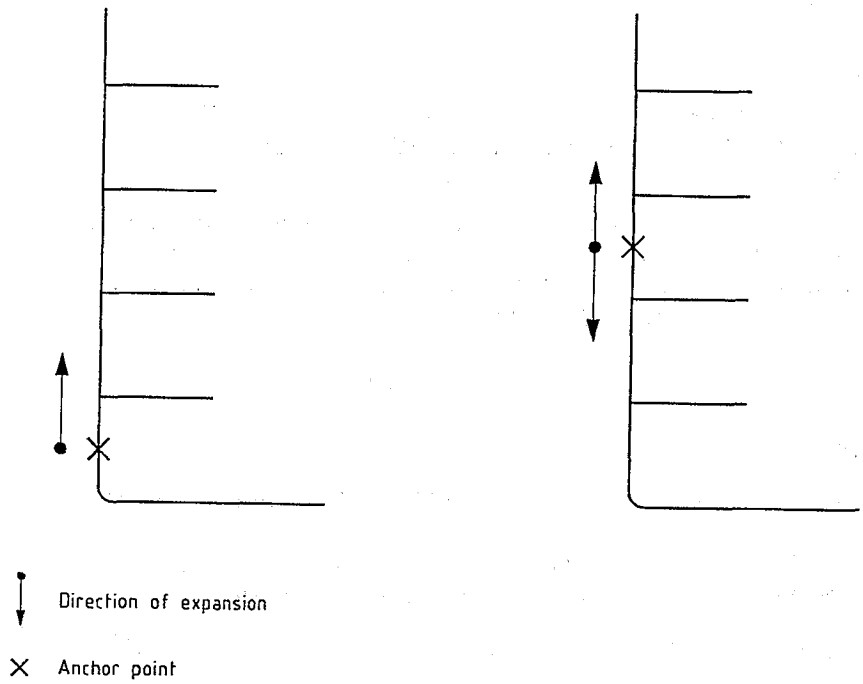


Figure 1 — Positioning of anchor points to guide the direction of thermal length variation (installation with branches)

6.2.3 Installation of pipes allowing thermal length variation by means of a flexible arm

The flexible arm should be sufficiently long to prevent damage.

The guide brackets should allow clearance to the wall also after thermal length variation. This is also applicable in cases where pipes are supported along their length.

A typical installation is shown in Figures 2 and 3.

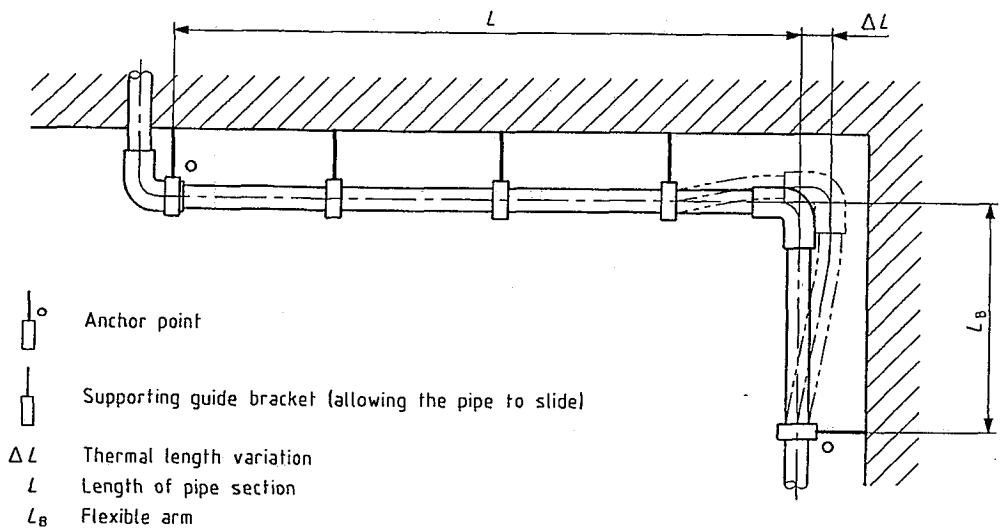


Figure 2 — Compensation of thermal length variation, ΔL, by flexible arm, L_B

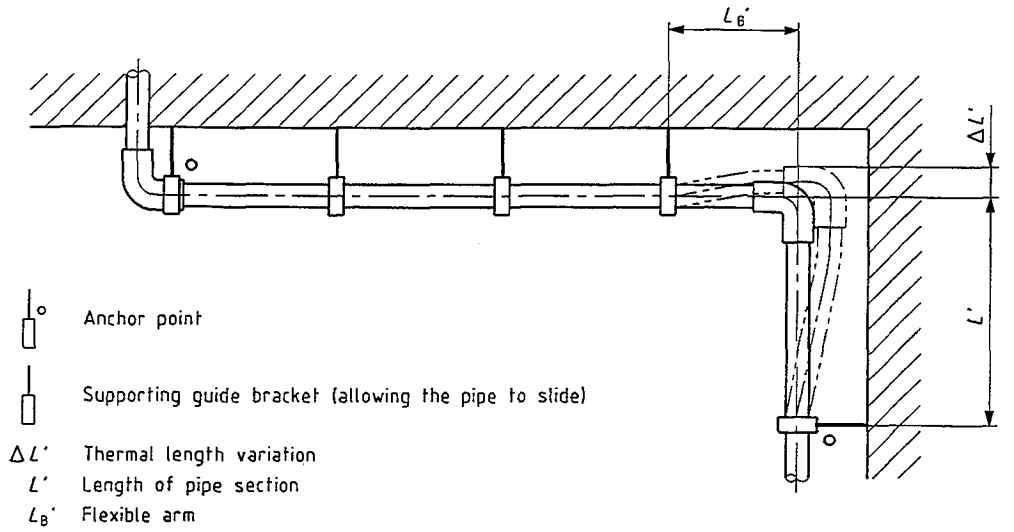


Figure 3 — Compensation of thermal length variation, $\Delta L'$, by flexible arm, L_B'

The minimum length of the flexible arm, L_B can be calculated according to equation (2):

$$L_B = C\sqrt{d_e \times \Delta L} \qquad (2)$$

where:

ΔL is the thermal length variation, in millimetres (see 6.2.1);

L_B is the flexible arm, in millimetres;

C is the material constant (see Table 2);

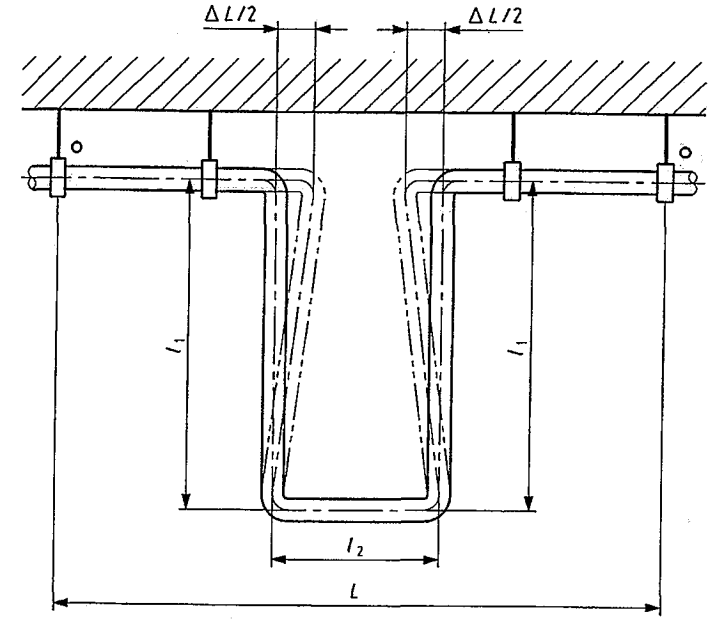
d_e is the outside diameter, in millimetres.

Table 2 — Value of C

Material	Material constant C
PVC-C	34
PE-X	12
PP-R	20
PB	10

6.2.4 Installation of pipes allowing expansion by means of an expansion loop

A typical installation is shown in Figure 4.



Anchor point

Supporting guide bracket (allowing the pipe to slide)

L Length of pipe section

l_1 Length of loop

l_2 Width of loop

ΔL Thermal length variation

Figure 4 — Compensation of the thermal length variation by expansion loop

It is preferable to design the loop so that $l_2 = 0{,}5 l_1$.

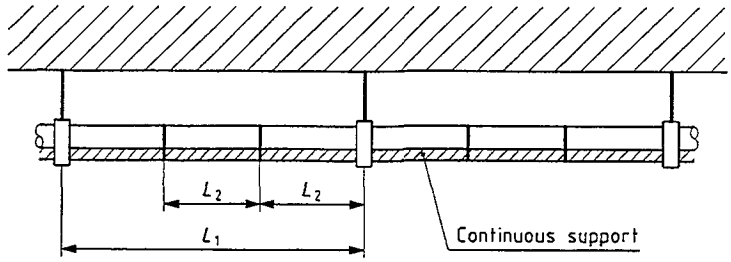
In this case the flexible arm is calculated according to equation (3).

$$L_B = C\sqrt{d_e \times \frac{2\Delta L}{2}} = 2l_1 + l_2 \qquad (3)$$

6.2.5 Installation of pipes allowing thermal length variation and with continuous support and supporting guide brackets

A typical installation is shown in Figure 5.

Maximum recommended distances between anchor point and supporting guide bracket respectively between supporting guide brackets, L_1, and between bindings, L_2, are given in Tables 3 and 4.



Supporting guide bracket (allowing the pipe to slide)

Binding

L_1 Distance between supporting guidebracket or between supporting guidebracket and anchor point

L_2 Distance between bindings

Figure 5 — Continuous support with supporting guide bracket allowing thermal length variation

Table 3 — Maximum recommended distance, L_1, between supporting bracket (approximate values)

Dimensions in millimetres

Pipe outside diameter	L_1	
	Cold water	Hot water
$d_e \leq 20$	1500	1000
$20 < d_e \leq 40$	1500	1200
$40 < d_e \leq 75$	1500	1500
$75 < d_e \leq 110$	2000	2000
$110 < d_e \leq 125$	2000	2000
$125 < d_e \leq 140$	2500	2500
$140 < d_e \leq 160$	2500	2500